

AF/CPV



00684.003325

PATENT APPLICATION

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of:)
AKIRA UNNO ET AL.)
Application No.: 10/071,095)
Filed: February 11, 2002)
For: PIEZOELECTRIC STRUCTURE, LIQUID)
EJECTION HEAD AND MANUFACTURING)
METHOD THEREFOR)

Examiner: M. Budd
Group Art Unit: 2834
June 15, 2005

Mail Stop Amendment
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

FIFTH INFORMATION DISCLOSURE STATEMENT

Sir:

In compliance with the duty of disclosure under 37 C.F.R. § 1.56 and in accordance with the practice under 37 C.F.R. §§ 1.97 and 1.98, the Examiner's attention is directed to the below English-language translation of a portion of the March 14, 2005 Office Action from the Korean Patent Office, a copy of which was enclosed with the Fourth Information Disclosure Statement filed on June 13, 2005.

In the Korean Office Action, "Reference 1" corresponds to JP 2000-37877 and "Reference 2" corresponds to KR 2000-16488.

“Claims 1 and 7 define the invention a piezoelectric structure comprising a vibrational plate and a piezoelectric film, and a method. The feature is in that vibrational plate including a layer of a monocrystal material and oxide layers sandwiching the aforementioned layer, and that piezoelectric film has a single orientation crystal structure. Reference 1 (Figure 1) discloses a printing head comprising a vibrational plate (20), an oxide piezoelectric member (60), wherein the vibrational plate (20) is sandwiched between the anti-oxide films (50), as is common with the present invention. Although the present invention is different in that vibrational plate and the piezoelectric member are made of silicon monocrystal structure, the silicon monocrystal structure is ordinarily employed in this technical field as disclosed in reference 2 (second and fourth embodiments), and therefore, is a commonly used means. No difficulty is seen in the simple incorporation of such a commonly used means in the structure of reference 1, and the effect of the incorporation is not unexpected.

The invention defined in Claims 6 and 12 is directed to a piezoelectric structure, a liquid ejecting head and a manufacturing method which is similar to the above-discussed invention but which formations of the upper electrode and the pressure chamber are added. However, reference 1 already discloses a structure including the upper electrode (70) and the liquid chamber (11). Therefore, the present invention is obvious from a simple combination of the structure of reference 1 and the structure of reference 2.

Claims 4 and 10 are dependent from Claims 1 and 7, wherein the composition of the piezoelectric film is limited to a monolayer structure, or a multilayer structure of different compositions, and the composition is limited to one of PZT and so on.

However, reference 2 (first embodiment) uses the PZT for the piezoelectric film, and discloses a structure using first and second layers of the piezoelectric film and the first layer for the piezoelectric film, not using the multilayer. No difficulty is seen in simply combining the structure of reference 1 and the structure of reference 2 to provide the structure of the present invention by one skilled in the art.

Claims 5 and 11 are dependent from Claims 1 and 7, and include limitations to the oxide layer (SiO₂ or the like). Reference 2 (first embodiment) discloses the structure of the vibrational plate (4) of a silicon oxide (SiO₂) layer. Therefore, the present invention results from a simple combination of the structure of reference 1 and reference 2. Claims 2, 3, 8 and 9 includes a further limitation to the film thicknesses of the vibrational plate and the piezoelectric film. However, the limitations of the films can be easily determined by one skilled in the art if necessary.

FORMAL MATTERS

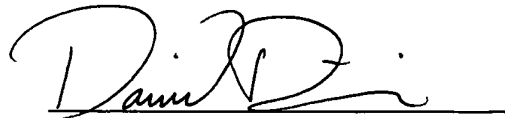
No fee is believed to be due. However, any fee due in connection with this paper should be charged to Deposit Account No. 06-1205.

CONCLUSION

Applicants respectfully request that the above information be considered by the Examiner and that an initialed copy of the enclosed Form PTO-1449 be returned indicating that such information has been considered.

Applicants' undersigned attorney may be reached in our Washington, D.C. office by telephone at (202) 530-1010. All correspondence should continue to be directed to our below-listed address.

Respectfully submitted,

A handwritten signature in black ink, appearing to read "David Divine", written over a horizontal line.

Attorney for Applicants
David A. Divine
Registration No. 51,275

FITZPATRICK, CELLA, HARPER & SCINTO
30 Rockefeller Plaza
New York, New York 10112-3800
Facsimile: (212) 218-2200
DWP/DAD/tmc

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